

REMARKS

Claims 1-4 are pending in the present application, each claim being amended in a previous response.

Claims 1 and 2 are rejected under 35 U.S.C. 102

Claims 1 and 2 are rejected under 35 U.S.C. 102(e) as being anticipated by Launey et al.

The present claimed invention is a voice control system for a technical device. The technical device is connected to one or more appliances. The system includes a microphone array with a plurality of microphones distributed over the device and the one or more appliances. The plurality of microphones convert a detected signal to electrical signals. A signal processing unit processes the electrical output signals of the microphone array such that background signals are reduced by a spatial separation of the voice signal and the background signals. A speech recognition unit converts the output signals from the microphone array into operational commands.

Launey et al. teach a signal processor unit for processing the output signal of microphones, as cited by the examiner, which addresses the problem of background noise (col.12, lines 60-65). However, the solution to the problem of background noise taught by Launey et al. is a system with “enhanced performance” (col.12, lines 64-67), namely “certain hardware, together with software” (col.12, lines 66-67). What Launey et al. discloses is “a voice recognition system...accomplished by means of the central processor and its interconnection [...] to a speech processor which in turn is connected to a remote microphone” (col.13, lines 3-7). This must be understood as a single standard microphone, as is explicitly mentioned in col.13, lines 26-28. The mentioned Crown PZM microphones have no directional characteristic, but a hemispherical polar pattern (see www.crownaudio.com/mic.htm/pzm.htm). Even if more than one of these remote microphones is connected to the speech processing unit, as mentioned in col.10, line 7, and implicitly shown in Fig.1, this will not automatically lead to a directional characteristic, or even the effective suppression of background noise as in the present claimed invention. Instead, Launey et al. pursue another goal with using multiple microphones, namely “multiple

“voice recognition locations” (col.15, line 37) when describing a home automation system that uses “different types of devices in different parts of the home” (col.15, lines 14-15).

Contrarily, it is an essential part of the present claimed invention to use a microphone array. A person skilled in the art of electro-acoustics understands a microphone array as mentioned in e.g. United States Patent No. 6,317,501, filed on March 16, 1998 and United States Patent No. 4,311,874, filed in 1979. A copy of each of these patents is being cited in an Information Disclosure Statement submitted with this response for the courtesy of the Examiner. Although referring to only two documents, the applicant will provide additional documents containing evidence for the understanding of the technical term “microphone array” if requested by the Examiner.

According to the first mentioned document, a microphone array is a “plurality of omnidirectional microphones” defining “a directivity by emphasizing a target sound and suppressing noise”. Further, the microphone array apparatus is capable of detecting the position of a sound source on the basis of a relationship among the phases of output signals of the microphones” (col.1, lines 10-16). The technical solution is that “the speech of the speaker can be emphasized by adding the phases of speech components” (col.1, lines 21-22).

US 4,311,874 explains that “the ambient noise signals picked up by the microphones add incoherently while the speech signals add in phase. The result is that the array has a much higher signal-to-noise ratio than a single microphone or several arbitrarily placed single microphones” (col.1, line 65 - col.2, line 2).

The directivity of a microphone array depends, among other things, on the distance between its single microphone components. The higher the distance, the higher the phase differences, and the better the directivity. While the plurality of microphones used for a microphone array in prior art applications was always integrated into a single device, the inventors of the present claimed invention recognized for the first time how the positioning of at least some of the microphone components can exceed the dimension of the voice controlled device, thus improving the directivity of the microphone array. Advantageously, the microphone components are integrated into existing appliances connected to the voice controlled device so that no additional installation is required.

It is particularly advantageous to use loudspeaker boxes for this purpose, as described in the present claimed invention to be the preferred embodiment, because the orientation of loudspeaker boxes is usually optimized for a favorite user position. Furthermore, this is an easy way to eliminate the sound coming from the loudspeakers in these boxes.

For a person skilled in the art it is therefore clear that Launey et al. deals with single or multiple microphones, but not with microphone arrays. Therefore, it is respectfully submitted that the claimed enhanced voice control system using a microphone array is neither mentioned nor suggested by Launey et al.

In view of the above remarks it is respectfully submitted that Launey et al. does not anticipated the present invention as claimed in claims 1 and 2. It is thus further respectfully submitted that this rejection is satisfied and should be withdrawn.

Claims 3 is rejected under 35 U.S.C. 103

Claims 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Launey et al. in view of Lea.

Lea recites a home audio visual network defining an open architecture for interoperating consumer electronic devices. The architecture allows for devices from different manufacturers to interoperate. Lea was cited to show a bi-directional network based on an IEEE 1394 bus. However, Lea neither discloses nor suggests the enhanced voice control system using a microphone array of the present claimed invention. It is thus respectfully submitted that Lea adds nothing when taken alone or in combination with Launey et al. that would make the present claimed invention unpatentable. It is thus further respectfully submitted that this rejection is satisfied and should be withdrawn.

Claims 3 is rejected under 35 U.S.C. 103

Claims 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Launey et al. in view of Stein.

Stein recites a module including a card mounted telecommunications interface which is replaceable in a conventional consumer and industrial electronics. The transceiver is able to communicate with one of a plurality of standardized wireless networks and provides audio input signals to a speaker or speakers. A microphone provides audio input signals to the transceiver. However, Stein neither discloses nor suggests the enhanced voice control system using a microphone array of the present claimed invention. It is thus respectfully submitted that Stein adds nothing when taken alone or in combination with Launey et al. that would make the present claimed invention unpatentable. It is thus further respectfully submitted that this rejection is satisfied and should be withdrawn.

For the reasons discussed above, claims 3 and 4 referring to claims 1 and 2 differ substantially from Lea and Stein, respectively.

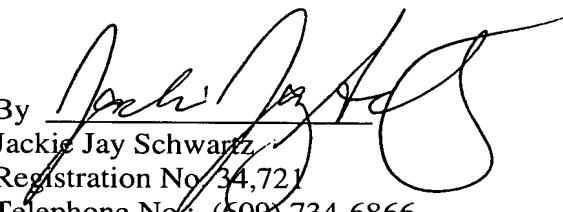
In the event there are further issues remaining in any respect the Examiner is respectfully requested to telephone attorney to reach agreement to expedite issuance of this application.

Since the present claims set forth the present invention patentable and distinctly, and are not taught by the cited art either taken alone or in combination, this response is believed to place this case in condition for allowance and the Examiner is respectfully requested to reconsider the matter, and to allow all of the claims in this case.

No additional fee is believed due. However, if an additional fee is due, please charge the additional fee to Deposit Account 07-0832.

In view of all of the foregoing, it is submitted that the amended application is now in condition for allowance, and such action is respectfully requested.

Respectfully submitted,
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